

Abstract Submitted
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Evidence for an orbital moment in the superconducting state of URu₂Si₂¹ GANG LI, QIU ZHANG, DANIEL RHODES, BIN ZHENG, PALLAB GOSWAMI, National High Magnetic Field Lab, P. TOBASH, FILIP RONNING, JOE D. THOMPSON, ERIC D. BAUER, Los Alamos National Lab, LUIS BALICAS, National High Magnetic Field Lab — URu₂Si₂ was suggested to be a chiral *d*-wave superconductor with a $k_z(k_x \pm ik_y)$ orbital component for the Cooper pair wave-function. This state breaks time-reversal symmetry due to the orbital moment associated with this pair wave-function. Here, we report torque magnetometry in URu₂Si₂ at high fields and very low temperatures revealing a change in the sign of the magnetic hysteresis for $H \rightarrow H_{c2}$, and for angles 15° away from the *ab*-plane, i.e. from a clear diamagnetic response dominated by the pinning of vortices to a state with a much smaller but paramagnetic-like hysteretic response which *disappears* at H_{c2} . If diamagnetism results from screening super-currents, we conclude that this hysteretic paramagnetic response must result from super-currents circulating in the opposite sense which generate an effective moment as expected for a chiral superconductor.

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